

## ***Interactive comment on “Total aerosol effect: radiative forcing or radiative flux perturbation?” by U. Lohmann et al.***

**U. Lohmann et al.**

ulrike.lohmann@env.ethz.ch

Received and published: 2 March 2010

Response to reviewer 3:

We thank the referee for his/her valuable comments and suggestions. The responses to your comments are below each comment.

1) Page 25634, line 5: "rain formation" should be changed to "precipitation formation".

Done

2) Page 25635, line 27: Please define "fast".

Done

3) Page 25636, lines 12-14: "For ... CO<sub>2</sub>, this adjustment cools .... However, for strato-  
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spheric ozone depletion, omission of the adjustment ...." Better: Do not use opposite logic in the two cases.

The sentence has been rewritten

4) Page 25636, line 29: What is "delta T"?

It is the change in the global mean surface temperature; we added that.

5) Page 25637, line 21: "longer time scales (those on which T changes)". Exactly how are these time scales determined? And, approximately how long are they?

Longer time scales (according to Gregory and Webb, 2008) refer to years if only the mixed layer of the ocean is considered or centuries if the full ocean is coupled to the atmospheric GCM. We added that.

6) Page 25637, line 28: What do you mean by "intermediate GCM"?

We added that. Shine et al. call it intermediate because the physical parameterizations are typical of what would have been state of the art in the 1980s. Because they are simpler, the computational costs are lower, allowing a wider set of calculations to be performed.

7) Page 25639, line 15: There is no "solid black line in Fig. 1".

There is a solid black line in the year 2002. We changed it to solid black vertical bar to make that clearer.

8) Page 25641, lines 13-14: What do you mean by "aerosol concentrations were put to zero for the .... integration of the model"? No time evolution of the aerosols?

Exactly. This is necessary in order to eliminate the interaction of aerosols with the radiation. We added that.

9) Page 25642, lines 19-20: "The deviation ... may be indicative of a semi-direct cloud response ..." Agreed, but couldn't it also be due to other effects, i.e., feedbacks between

the climate system and clouds?

Yes, it could be. We added that possibility.

10) Page 25643, lines 6-7: This sentence is poorly worded. Apart from typos (see below), it is not clear what "because of the inclusion of fast interactions and feedbacks in the latter" means. Shouldn't it be "the former", i.e., the RFP estimates, rather than "the latter", i.e., the forcing distributions?

That is right and the sentence has been rewritten.

11) Typos, etc: Page 25641, line 14: "set to zero" would be better than "put to zero".

Done

12) Page 25641, line 14: "forward integration in time of the model" is poorly phrased. Of course the integration is forward in time. Suggestion: "time integration of the model".

Corrected

13) Page 25641, line 26: Please insert comma between "CO2" and "as an increase".

Done

14) Page 25642, line 3: Please insert comma between "CO2" and "RFP".

Done

15) Page 25643, line 6: "pattern" should be "patterns".

Corrected

16) Page 25643, line 6: "are a noisy version" should be "are noisy versions".

Corrected

17) Page 25643, lines 12-15: This sentence is too long, and poorly structured, with the essence of it, "to be compared", appearing almost at the end.

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The sentence has been rewritten.

18) Page 25643, line 17: Suggest to replace "but do not differ systematically" by ", while they do not systematically differ".

Done

19) Page 25656, Fig.1 caption: Replace "Per method" by "For each method".

Done

20) Page 25656, Fig.1 caption: Replace "effects considered" by "effect considered".

Done

21) Page 25656, Fig.1 caption: Replace "satellite only" by "satellite estimates only".

Done

22) Page 25656, Fig.1 caption: Replace "yellow circle represents an estimate of" by "yellow dots represent estimates of the combined".

Done

23) Page 25656, Fig.1 caption: Replace "Black circles" by "Black dots".

Done

24) Page 25656, Fig.1 caption: Replace "green circles" by "green dots".

Done

25) Page 25657, Fig.2 caption: The acronyms need to be explained. E.g., does "IAE" refer to the cloud albedo effect only?

The acronyms DAE and IAE have been added to the text and to Table 1.

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Interactive comment on Atmos. Chem. Phys. Discuss., 9, 25633, 2009.

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